What is claimed is:

1. An apparatus for fabricating nanostructure-based devices on workpieces, the apparatus comprising:

a stage for supporting a workpiece, said workpiece having catalyst thereon;

a radiating-energy source configured to focus radiating energy, from a position spaced apart from said workpiece, toward a work region of said workpiece to directly heat catalyst at said work region, without directly heating catalyst at one or more other work regions of said workpiece, at least the work region being within a chamber; and

a feedstock delivery system that delivers feedstock gas to said catalyst at said work region, said feedstock delivery system including a feedstock heating system, said feedstock heating system configured to heat said feedstock gas, not merely by any global heating of said chamber or any direct excitation of gas over said work region by said focused radiating energy.

2. An apparatus according to claim 1, wherein said radiating-energy source comprises a laser system that emits laser beams.

3. An apparatus according to claim 2, wherein said radiating-energy source is positioned and aligned such that all catalyst throughout said work region that are desired for seeding growth of nanostructures are irradiated, whether by a single period of operation, or by multiple distinct periods of operation in which each period of said multiple periods uses a different program of emission parameters.

4. An apparatus according to claim 1, wherein said radiating-energy source includes a focused acoustic, focused radio frequency (RF), focused infrared (IR), or focused microwave source.

5. An apparatus according to claim 4, wherein said radiating-energy source is configured such that all catalyst throughout said work region that are desired for seeding growth of nanostructures are irradiated, whether within a single period of operation, or within multiple distinct periods of operation.

6. An apparatus according to claim 1, wherein said feedstock heating system includes a resistive heater or a radiating-energy heating system for preheating said feedstock gas prior to releasing said feedstock gas to flow over said work region.

7. An apparatus according to claim 6, wherein said feedstock heating system is configured to preheat said feedstock gas at a nozzle where said feedstock gas exits said feedstock delivery system toward said catalyst.

8. An apparatus according to claim 6, wherein said feedstock heating system preheats said feedstock gas at a portion of said feedstock delivery system that precedes an opening from which said feedstock gas exit said feedstock delivery system.

9. An apparatus according to claim 1, wherein said feedstock delivery system is compatible with gas precursors to nanotubes, nanowires, and nanostructures.

10. An apparatus according to claim 9, wherein said feedstock delivery system is compatible with a gas precursor selected from the set consisting of CH_4, C_2H_4, C_2H_2, CO, Cl_2, O_2, H_2, N_2, NH_3, SiH_4, GeH_4, and vapor or carrier gas containing materials including at least one of C, Si, Ge, Ga, In, Sn, N, Ga, Ag, Au, Mo, Se, Te, As, Zn, Cd, Mg, Cu, Al, B, S, P, Ti, V, Pt, and Pd.

11. An apparatus according to claim 1, wherein gas included in said feedstock delivery system include nonreactive gases and gases used as carriers for nanostructure precursor materials.

12. An apparatus according to claim 1, wherein said feedstock delivery system is positionable in at least height and direction of gas flow toward said work region.

13. An apparatus according to claim 1, wherein said feedstock delivery system is positionable in X, Y, and Z directions.

14. An apparatus according to claim 1, wherein said stage can be translated or rotated relative to the radiating-energy source, whereby any work region among said workpiece is capable of being positioned for exposure to said radiating-energy source.

15. An apparatus according to claim 1, wherein said radiating-energy source can be translated or rotated relative to said stage, whereby said radiating-energy source is capable of being selectively positioned for radiating energy onto any given work region of a workpiece.

16. An apparatus according to claim 1, wherein said stage includes a stage temperature-control unit for helping to control temperature of a workpiece.

17. An apparatus according to claim 16, wherein said stage temperature-control unit is one that is capable of cooling a workpiece from equilibrium room temperature or a processing temperature to as low as –250 degrees Centigrade.

18. An apparatus according to claim 16, wherein said stage temperature-control unit is one that is capable of heating a workpiece from 0 degrees Centigrade or the equilibrium room temperature to 1200 degrees Centigrade.

19. An apparatus according to claim 1, wherein the workpiece includes Si, $Si_3 N_4$, SiO_2, $Al_2 O_3$, GaN, ceramics, glass, quartz, or a combination thereof.

20. An apparatus according to claim 1, wherein the catalyst includes Fe, Ni, Co, Au, Sn, In, Mo, Ti, Ru, Si, Ag, Pt, or Pd particles, or oxides thereof, and said particles are within a range of less than 1 nanometer in size to 100 nanometers in size.

21. An apparatus according to claim 20, wherein said particles are supported by Al_2O_3, SiO_2, C, Si, TiO_2, or a combination thereof.

22. An apparatus according to claim 21, wherein said nanostructure-based devices include nanostructures that comprise C, Si, Ge, Ga, In, Sn, N, Ga, Ag, Au, Mo, Se, Te, As, Zn, Cd, Mg, Cu, Al, B, S, P, Ti, V, Pt, or Pd, or oxides, or combinations thereof.

23. An apparatus according to claim 1, wherein said nanostructure-based devices include nanotubes or nanowires with diameters less than 100 nanometer and greater than 0.1 nanometer.

24. An apparatus according to claim 1, wherein said nanostructure-based devices are carbon nanostructure-based devices.

25. An apparatus according to claim 1, further comprising an adjustable electromagnetic field generator for affecting direction of nanostructure growth.

26. A method for fabricating nanostructure-based devices on a workpiece, the workpiece including multiple sections, said sections hereinafter referred to as dies, the method comprising:

positioning a die of said workpiece and an energy source in alignment for said energy source to radiate energy toward a surface of said die, said surface being within a chamber;

heating feedstock gas to within a predetermined temperature range, and then delivering said heated feedstock gas into said chamber to flow across said surface of said die;

radiating energy from said energy source externally toward said surface of said die, to thereby heat a catalyst at said surface of said die, wherein a nanostructure is formed at said heated catalyst.

27. A method according to claim 26, wherein said radiating step comprises emitting at least one laser beam.

28. A method according to claim 26, wherein said radiating step comprises emitting focused acoustic, focused radio frequency (RF), focused infrared (IR), or focused microwave energy.

29. A method according to claim 26, wherein said heating step comprises operating a resistive heater or a radiating-energy heating system to heat said feedstock gas.

30. A method according to claim 29, wherein said operating step comprises heating a nozzle region of a gas delivery system via said resistive heater, and said

delivering step comprises delivering said heated feedstock gas via said nozzle region into said chamber toward said catalyst.

31. A method according to claim 26, wherein said feedstock gas comprises a gas precursor to nanotubes, nanowires, or nanostructures.

32. A method according to claim 31, wherein said gas precursor is selected from the set consisting of CH_4, C_2H_4, C_2H_2, CO, Cl_2, O_2, H_2, N_2, NH_3, SiH_4, GeH_4, and vapor or carrier gas containing materials including at least one of C, Si, Ge, Ga, In, Sn, N, Ga, Ag, Au, Mo, Se, Te, As, Zn, Cd, Mg, Cu, Al, B, S, P, Ti, V, Pt, and Pd.

33. A method according to claim 26, wherein said feedstock gas comprises nonreactive gases and gases used as carriers for nanostructure precursor materials.

34. A method according to claim 26, wherein said delivering step comprises delivering said heated feedstock gas from a nozzle, into said chamber to flow across said surface of said die, the method further comprising automatically positioning a nozzle in perpendicular distance from said surface and in direction of gas flow from said nozzle, prior to completion of said delivering step.

34. A method according to claim 26, wherein said delivering step comprises delivering said heated feedstock gas from a nozzle, into said chamber to flow across said surface of said die, the method further comprising automatically positioning a nozzle in X, Y, and Z directions, prior to completion of said delivering step.

35. A method according to claim 26, wherein said positioning step comprises translating or rotating a stage by which said die is supported such that said die is selected

for processing thereon, wherein any other die of said workpiece was also capable of alternatively having been selected in said positioning step.

36. A method according to claim 26, further comprising actively heating or cooling said workpiece by transmitting heat to or from said workpiece via a stage by which said die is supported.